CLAIMS:

1. A radiation-emitting semiconductor device (10) comprising a semiconductor body (1) and a substrate (2), which silicon-containing semiconductor device (1) has a lateral semiconductor diode which is situated on an insulating layer (7) that separates the diode from the substrate (2), which lateral semiconductor diode successively comprises a first semiconductor region (3) of a first conductivity type and with a first doping concentration, a second semiconductor region (4) of the first or a second conductivity type opposite to the first conductivity type and with a second doping concentration that is lower than the first doping concentration, and a third semiconductor region (5) of the second conductivity type and with a third doping concentration that is higher than the second doping concentration, the first and the third semiconductor region (3, 5) each being provided with a connection region (6, 8), and, during operation, radiation (S) being generated in the second semiconductor region (4) as a result of recombination of charge carriers injected from the first and the third semiconductor region in the second semiconductor region (4), characterized in that the second semiconductor region (4) comprises a central portion (4A) that is surrounded by a further portion (4B) the bandgap of which is larger than that of the central portion (4A).

2. A radiation-emitting semiconductor device (10) as claimed in claim 1, characterized in that the bandgap of the silicon-containing semiconductor material is increased in the further portion (4B) in that the thickness of said further portion is so small that quantum effects occur therein, whereas the thickness of the central portion is so large that said effects are substantially absent.

3. A radiation-emitting semiconductor device (10) as claimed in claim 2, characterized in that the thickness of the semiconductor body (1) at the location of the further portion (4B) to be formed is reduced by means of a local oxidation (20) of the semiconductor body.

4. A radiation-emitting semiconductor device (10) as claimed in claim 3, characterized in that the thickness of the semiconductor body (1) at the location of the central portion (4A) to be formed is reduced by means of a further local oxidation (21).

5. A radiation-emitting semiconductor device (10) as claimed in claim 2, 3 or 4, characterized in that the thickness of the further portion (4B) is 10 nm at the most, and the thickness of the central portion (4A) is at least twice the thickness of the further portion (4B).

6. A radiation-emitting semiconductor device (10) as claimed in any one of the preceding claims, characterized in that the central portion (4A) is provided with sub-regions wherein the bandgap is increased with respect to the rest of the central portion by means of an ion implantation of suitable atoms.

7. A radiation-emitting semiconductor device as claimed in any one of the preceding claims, characterized in that the substrate (2) is made of silicon.

8. A method of manufacturing a radiation-emitting semiconductor device (10), wherein an insulating layer (7) with a silicon-containing semiconductor body (1) is present on a substrate (2), and a lateral semiconductor diode is formed in the semiconductor body (1), which semiconductor diode successively comprises a first semiconductor region (3) of a first conductivity type and with a first doping concentration, a second semiconductor region (4) of the first or a second conductivity type opposite to the first conductivity type and with a second doping concentration which is lower than the first doping concentration, and a third semiconductor region (5) of the second conductivity type and with a third doping concentration which is higher than the second doping concentration, the first and the third semiconductor region (3, 5) each being provided with a connection region (6, 8), and, during operation, radiation being generated in the second semiconductor region (4) as a result of recombination of charge carriers injected from the first and the third semiconductor region in the second semiconductor region (4), characterized in that the second semiconductor region (4) is provided with a central portion (4A) which is surrounded by a further portion (4B) the bandgap of which is increased with respect to that of the central portion (4A).

9. A method as claimed in claim 8, characterized in that the bandgap of the further portion (4B) is increased by giving this portion (4B) a thickness which is so small that

quantum effects occur therein in the thickness direction, while the thickness of the central portion (4A) is chosen to be so large that these effects substantially do not occur.

10. A method as claimed in claim 9, characterized in that the thickness of the semiconductor body (1) is reduced at the location of the further portion (4B) to be formed, by means of a local oxidation (20) of the semiconductor body (1).

11. A method as claimed in claim 10, characterized in that the thickness of the semiconductor body (1) is reduced at the location of the central portion (4A) to be formed, by means of a further local oxidation (21).

12. A method as claimed in claim 9, characterized in that the further portion (4B) and a first portion of the central portion (4A) are formed as a continuous layer, while a second portion, situated on the first portion, of the central portion (4A) is formed by means of selective epitaxy.

13. A method as claimed in claim 8, 9, 10, 11 or 12, characterized in that silicon is chosen as the material for the substrate (2).

14. A method as claimed in claim 8, 9, 10, 11, 12 or 13, characterized in that suitable atoms are introduced into the central portion (4A) by means of ion implantation, as a result of which the bandgap of the central portion is locally increased with respect to the rest of the central portion (4A).

15. A method as claimed in claim 14, characterized in that germanium, silicon or oxygen atoms are chosen as the atoms implanted in the central portion (4A).